Figure 1

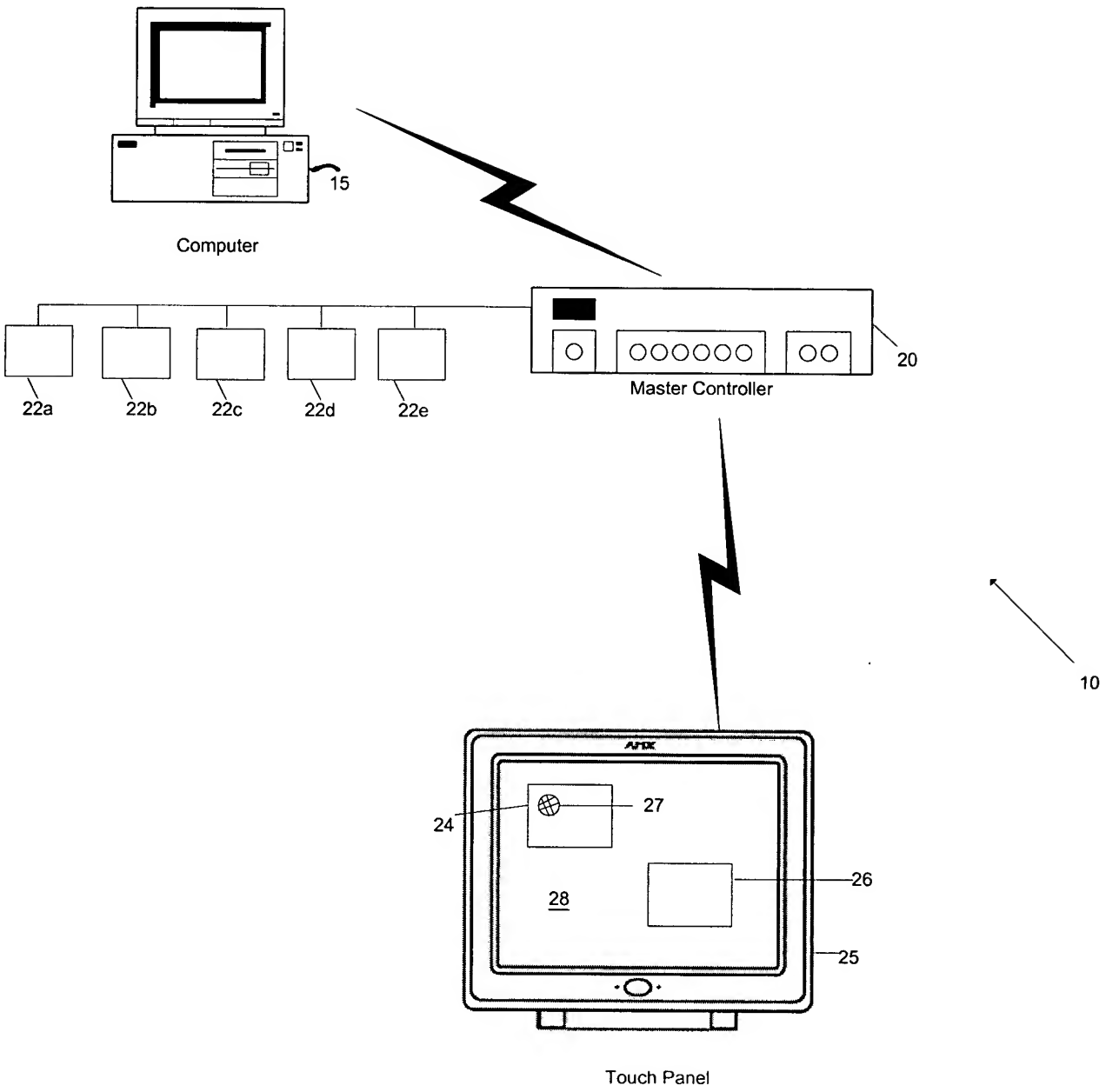

15
Computer
22a
22b
22c
22d
22e
20
Master Controller
10
24
27
28
26
25
Touch Panel

Figure 2

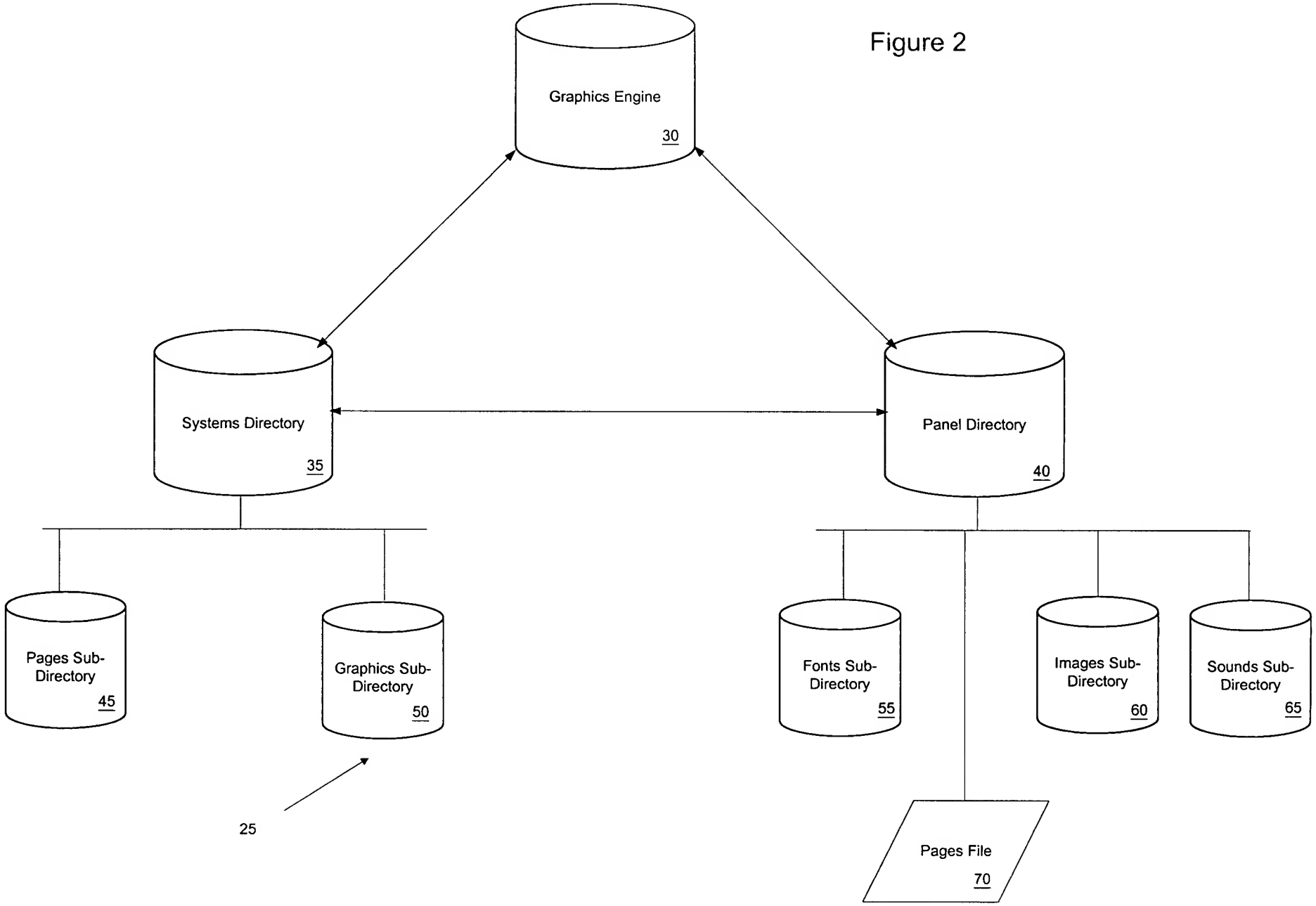

Graphics Engine
30
Systems Directory
35
Panel Directory
40
Pages Sub-Directory
45
Graphics Sub-Directory
50
Fonts Sub-Directory
55
Images Sub-Directory
60
Sounds Sub-Directory
65
Pages File
70
25

Figure 3

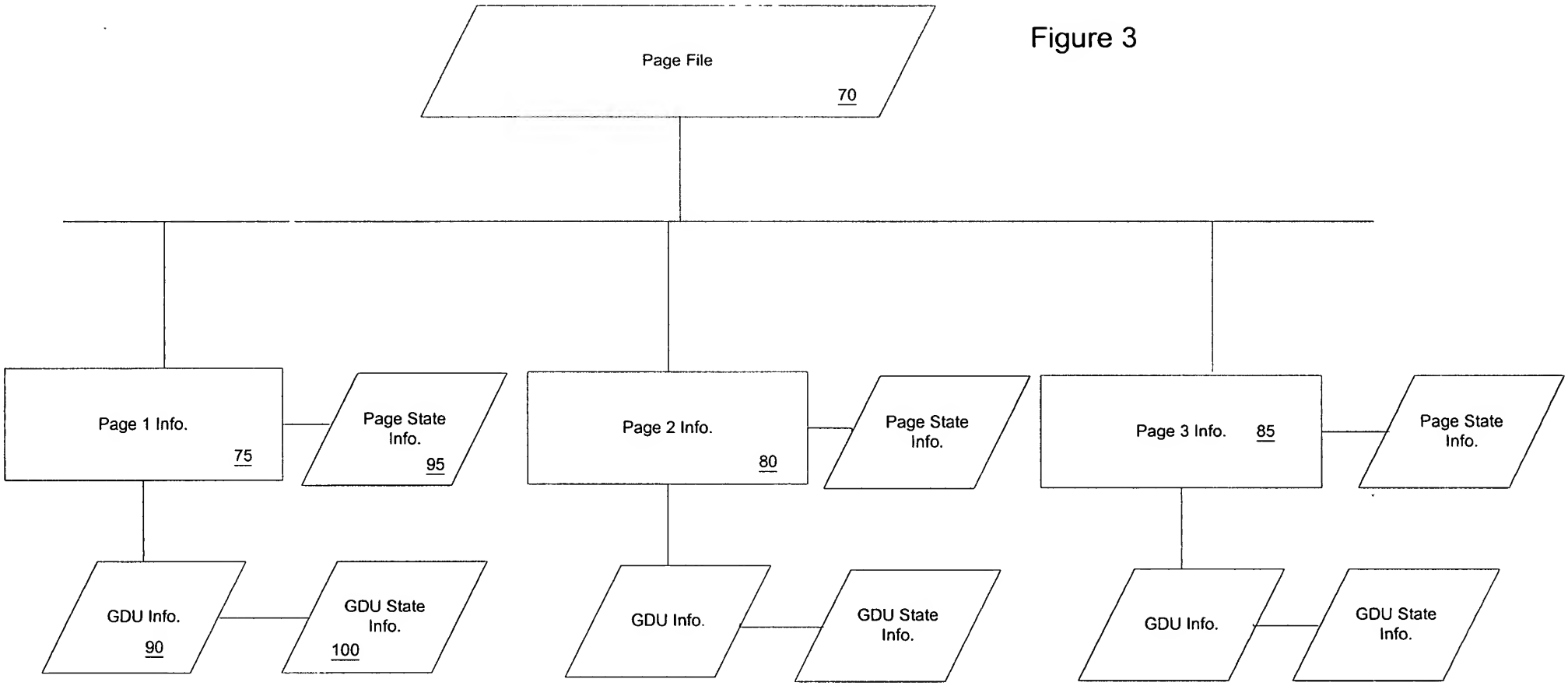

Page File
70
Page 1 Info.
75
Page State Info.
95
Page 2 Info.
80
Page State Info.
Page 3 Info.
85
Page State Info.
GDU Info.
90
GDU State Info.
100
GDU Info.
GDU State Info.
GDU Info.
GDU State Info.

Figure 4A

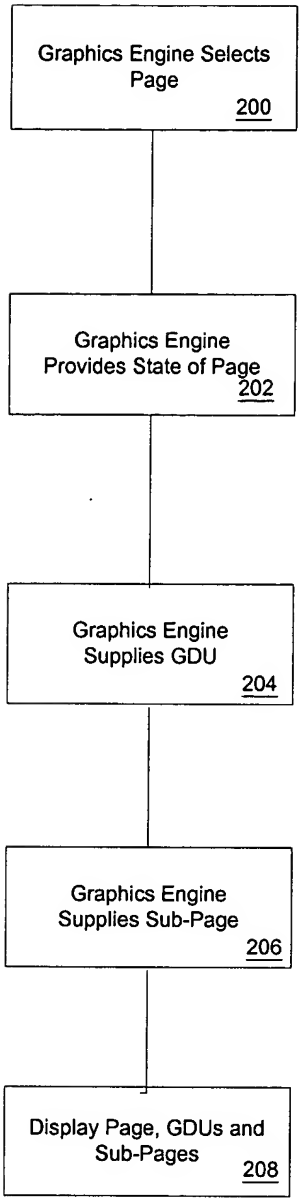

Graphics Engine Selects Page
200
Graphics Engine Provides State of Page
202
Graphics Engine Supplies GDU
204
Graphics Engine Supplies Sub-Page
206
Display Page, GDUs and Sub-Pages
208

FIGURE 4B

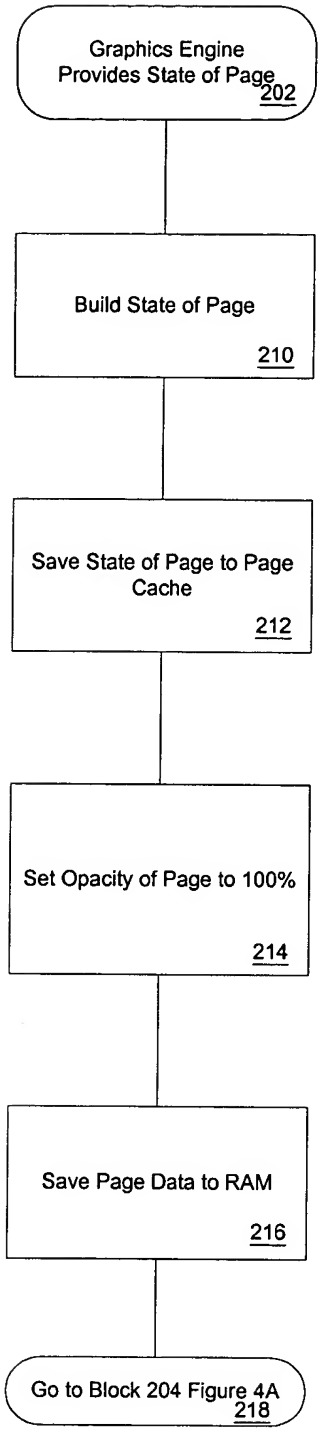

Graphics Engine Provides State of Page
202
Build State of Page
210
Save State of Page to Page Cache
212
Set Opacity of Page to 100%
214
Save Page Data to RAM
216
Go to Block 204 Figure 4A
218

FIGURE 4C

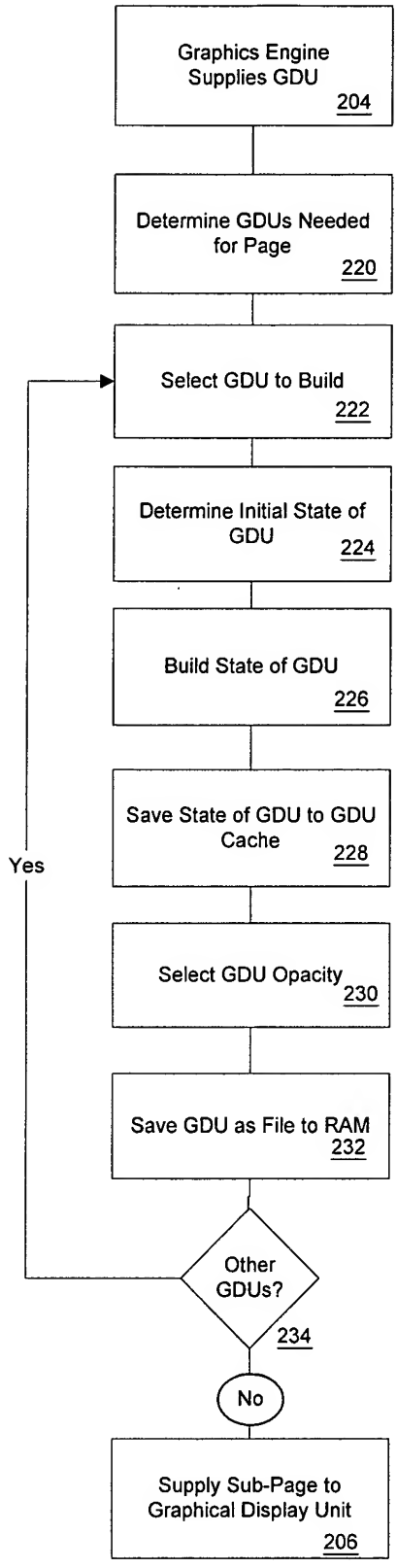

Graphics Engine Supplies GDU
204
Determine GDUs Needed for Page
220
Select GDU to Build
222
Determine Initial State of GDU
224
Build State of GDU
226
Save State of GDU to GDU Cache
228
Select GDU Opacity
230
Save GDU as File to RAM
232
Other GDUs?
234
Yes
No
Supply Sub-Page to Graphical Display Unit
206

FIGURE 4D

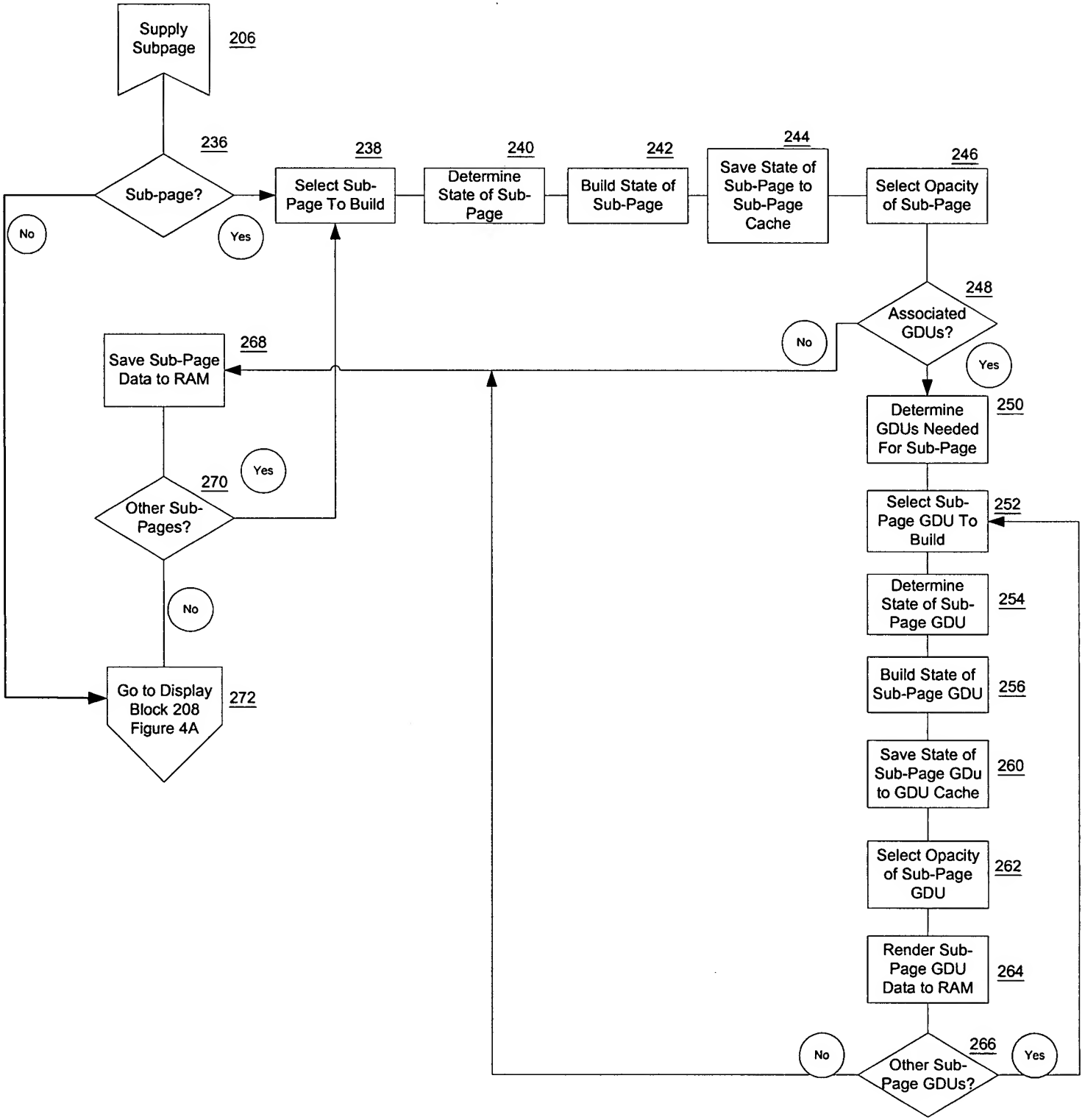
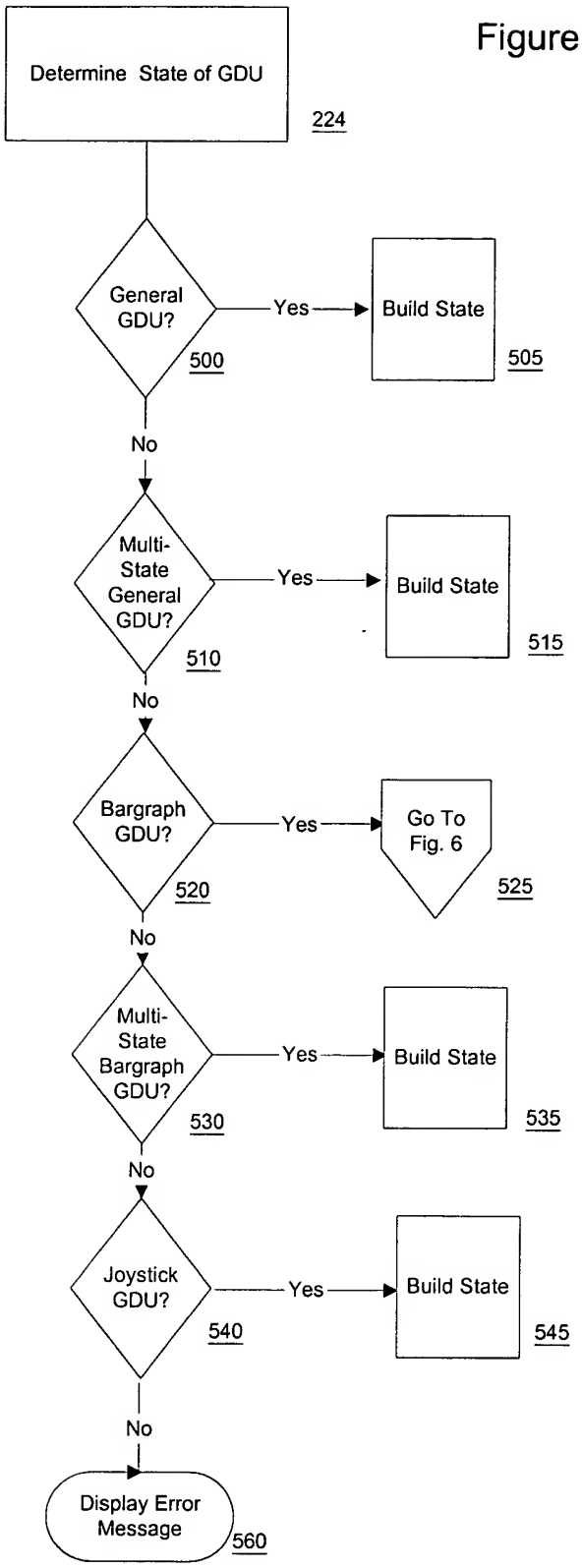

Supply Subpage
206
236
Sub-page?
No
Yes
238
Select Sub-Page To Build
240
Determine State of Sub-Page
242
Build State of Sub-Page
244
Save State of Sub-Page to Sub-Page Cache
246
Select Opacity of Sub-Page
248
Associated GDUs?
No
Yes
268
Save Sub-Page Data to RAM
270
Other Sub-Pages?
Yes
No
272
Go to Display Block 208 Figure 4A
250
Determine GDUs Needed For Sub-Page
252
Select Sub-Page GDU To Build
254
Determine State of Sub-Page GDU
256
Build State of Sub-Page GDU
260
Save State of Sub-Page GDu to GDU Cache
262
Select Opacity of Sub-Page GDU
264
Render Sub-Page GDU Data to RAM
266
Other Sub-Page GDUs?
No
Yes

Figure 5


Determine State of GDU
224
General GDU?
500
Yes
Build State
505
No
Multi-State General GDU?
510
Yes
Build State
515
No
Bargraph GDU?
520
Yes
Go To Fig. 6
525
No
Multi-State Bargraph GDU?
530
Yes
Build State
535
No
Joystick GDU?
540
Yes
Build State
545
No
Display Error Message
560

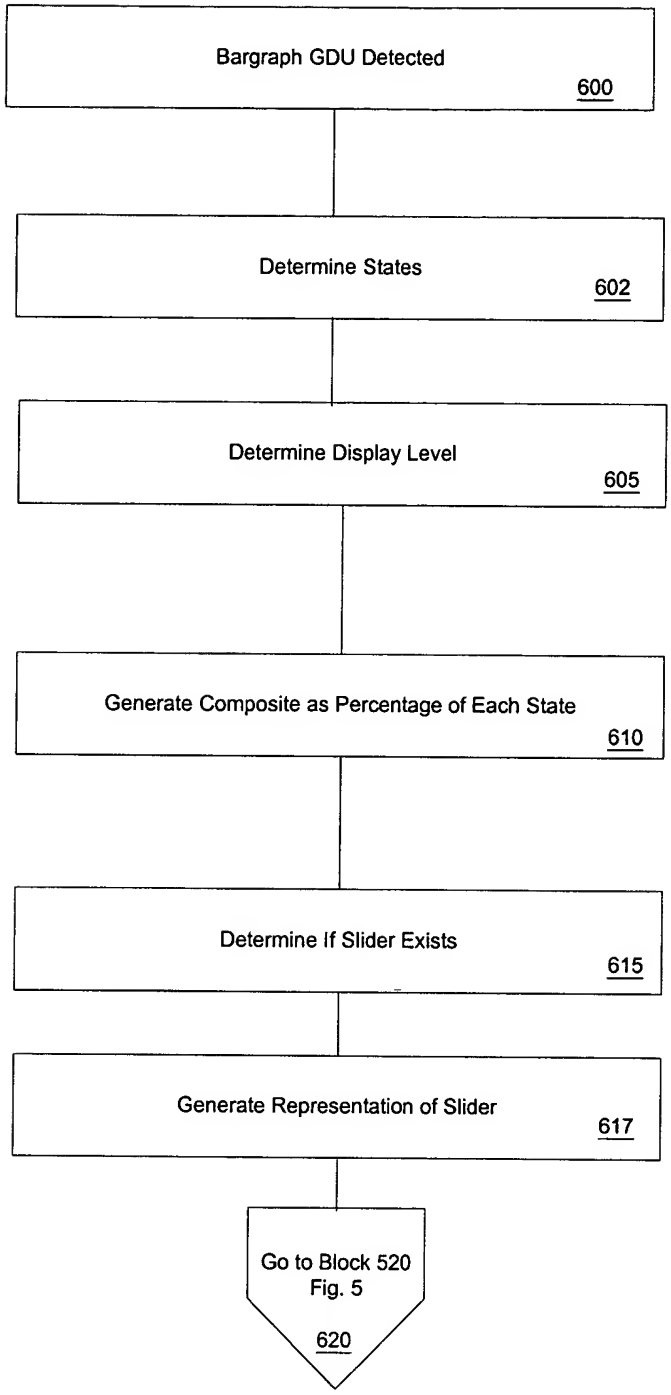
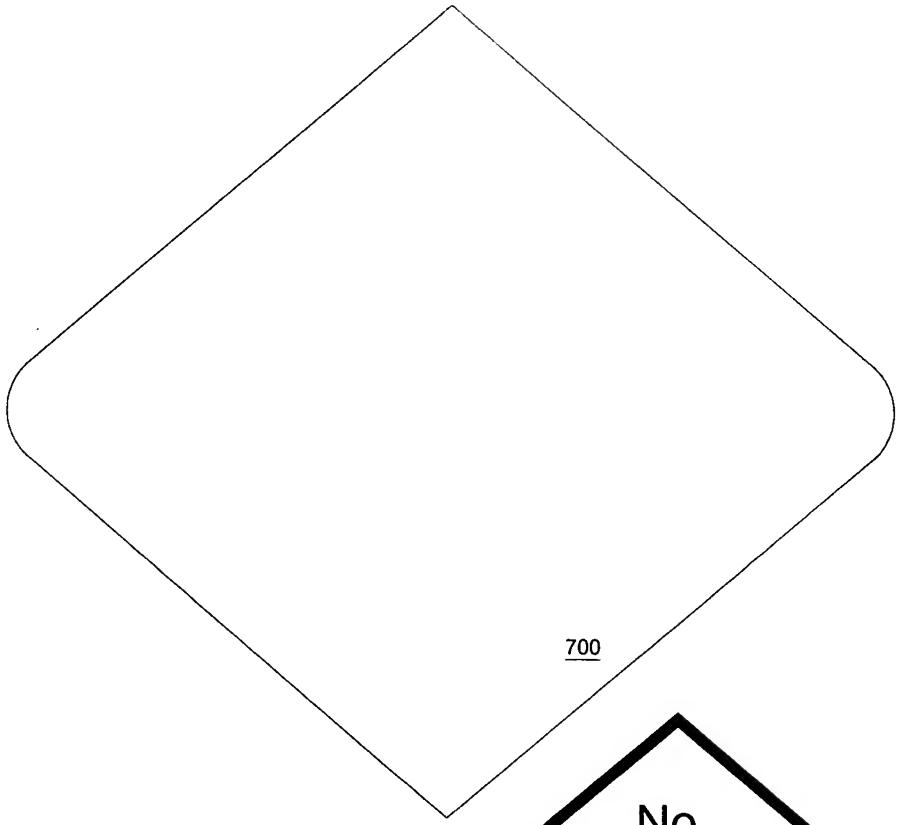

Bargraph GDU Detected
600
Determine States
602
Determine Display Level
605
Generate Composite as Percentage of Each State
610
Determine If Slider Exists
615
Generate Representation of Slider
617
Go to Block 520
Fig. 5
620

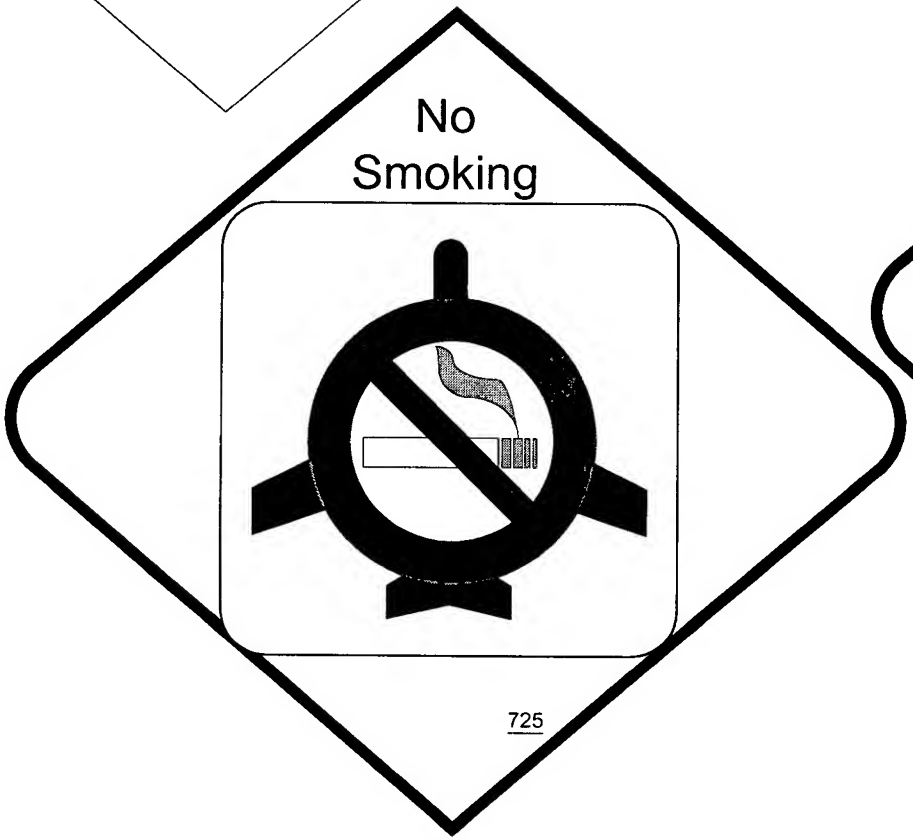
Figure 6

Figure 7



No Smoking

715



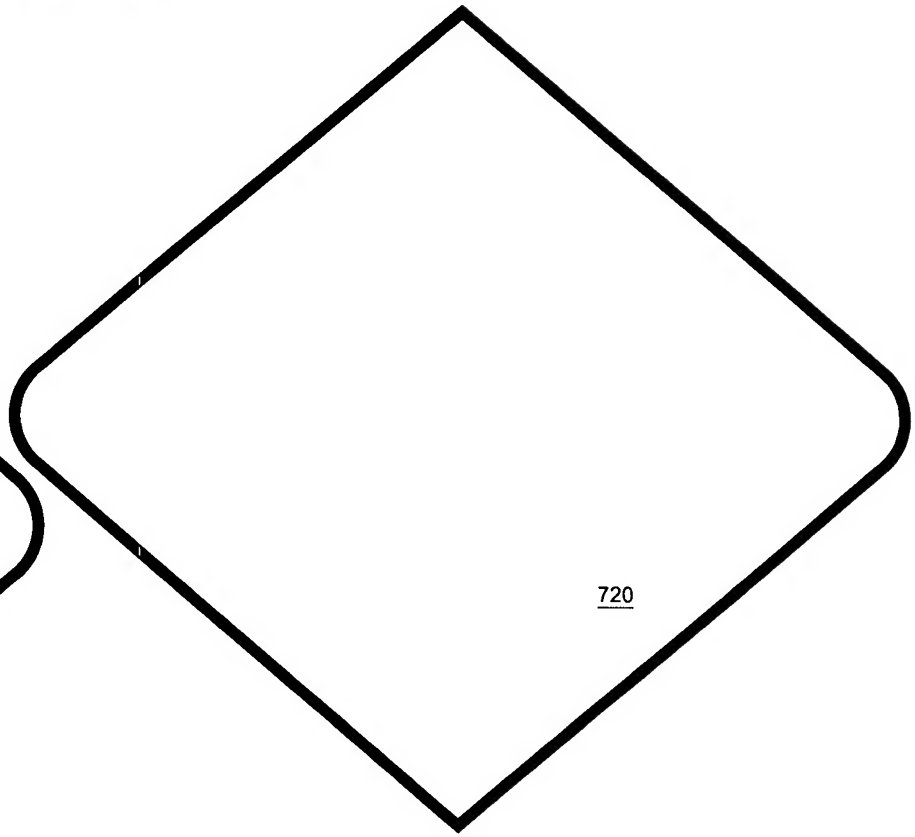


Figure 8

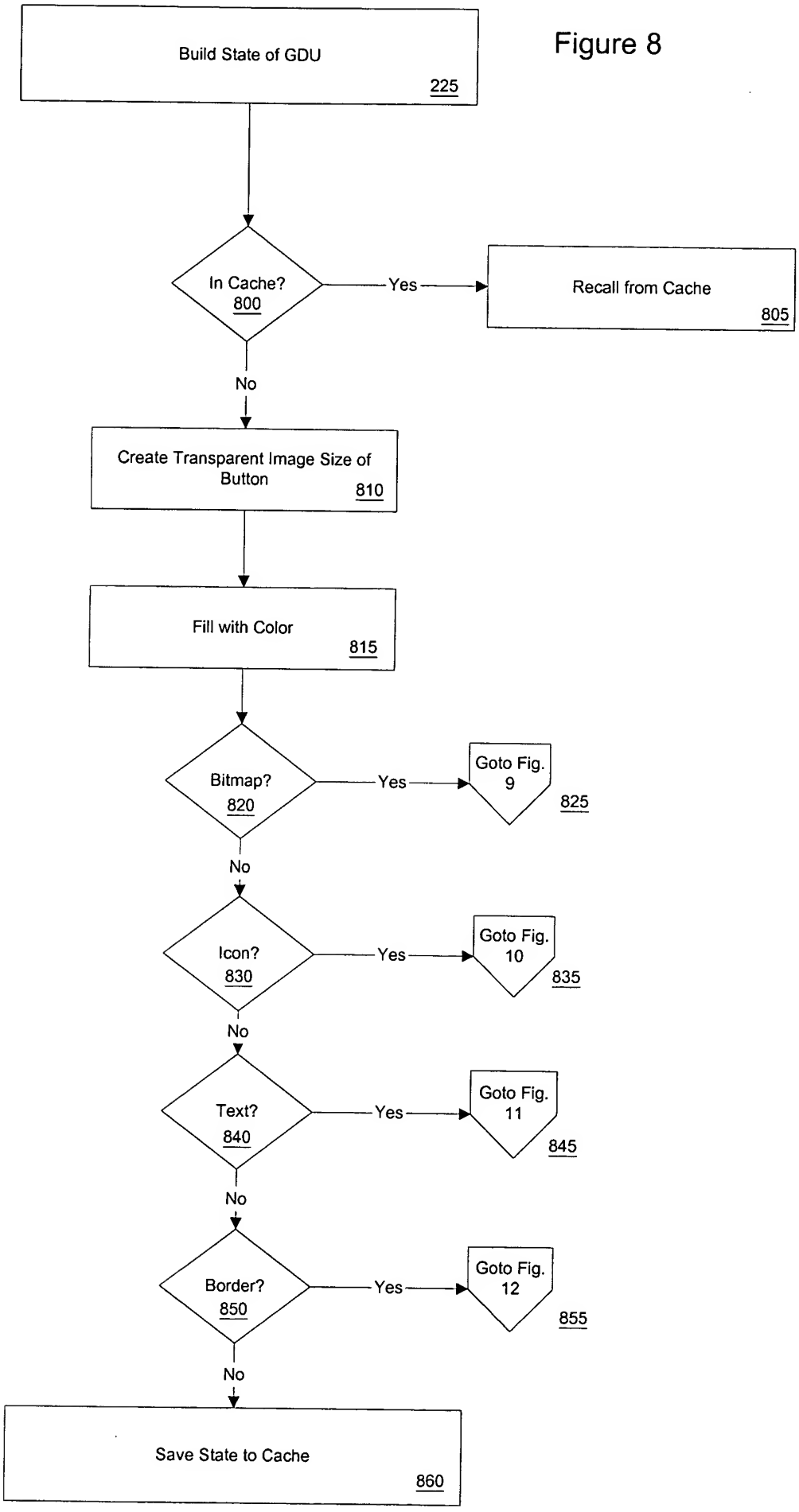
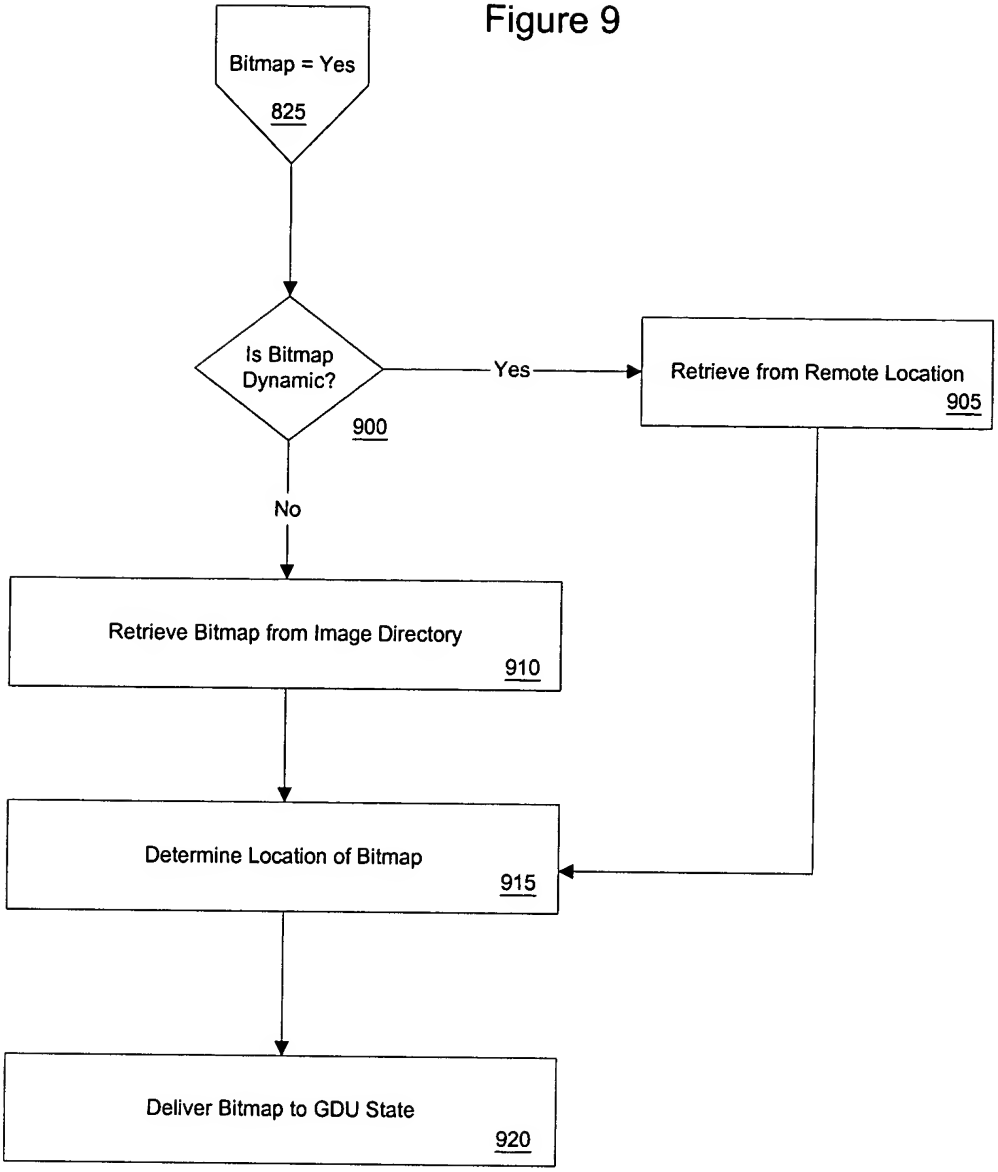

Build State of GDU
225
In Cache?
800
Yes
Recall from Cache
805
No
Create Transparent Image Size of Button
810
Fill with Color
815
Bitmap?
820
Yes
Goto Fig. 9
825
No
Icon?
830
Yes
Goto Fig. 10
835
No
Text?
840
Yes
Goto Fig. 11
845
No
Border?
850
Yes
Goto Fig. 12
855
No
Save State to Cache
860

Figure 9


Bitmap = Yes
825
Is Bitmap Dynamic?
900
Yes
Retrieve from Remote Location
905
No
Retrieve Bitmap from Image Directory
910
Determine Location of Bitmap
915
Deliver Bitmap to GDU State
920

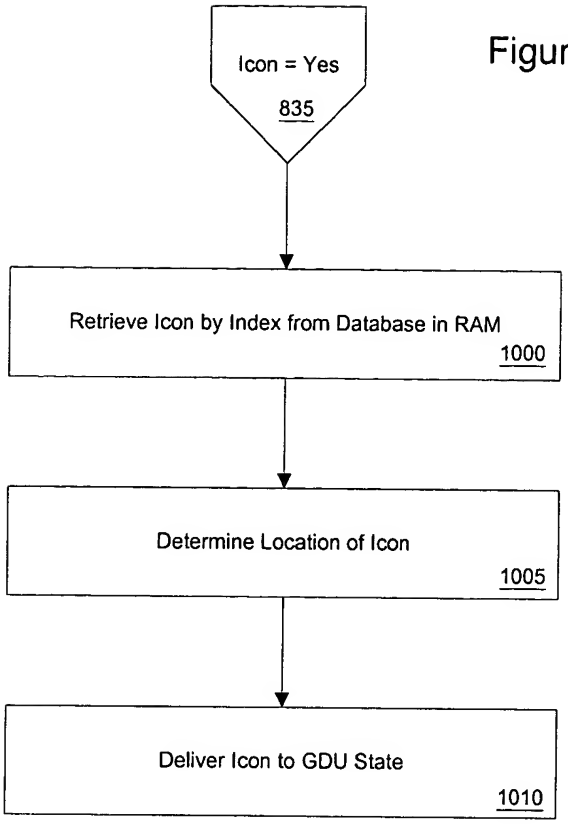

Icon = Yes
835
Retrieve Icon by Index from Database in RAM
1000
Determine Location of Icon
1005
Deliver Icon to GDU State
1010

Figure 10

Figure 11

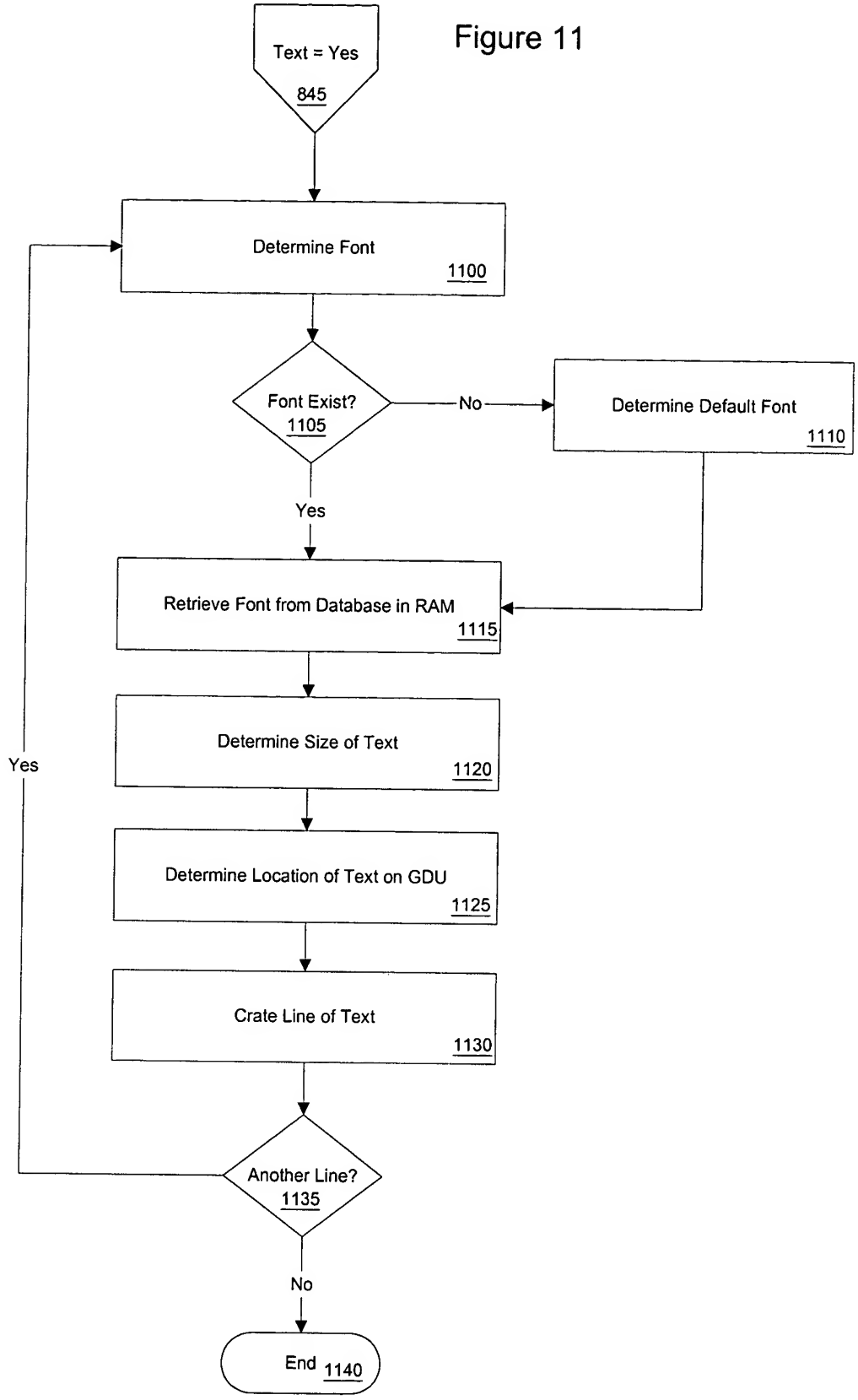

Text = Yes
845
Determine Font
1100
Font Exist?
1105
No
Determine Default Font
1110
Yes
Retrieve Font from Database in RAM
1115
Determine Size of Text
1120
Determine Location of Text on GDU
1125
Crate Line of Text
1130
Another Line?
1135
Yes
No
End 1140

Figure 12

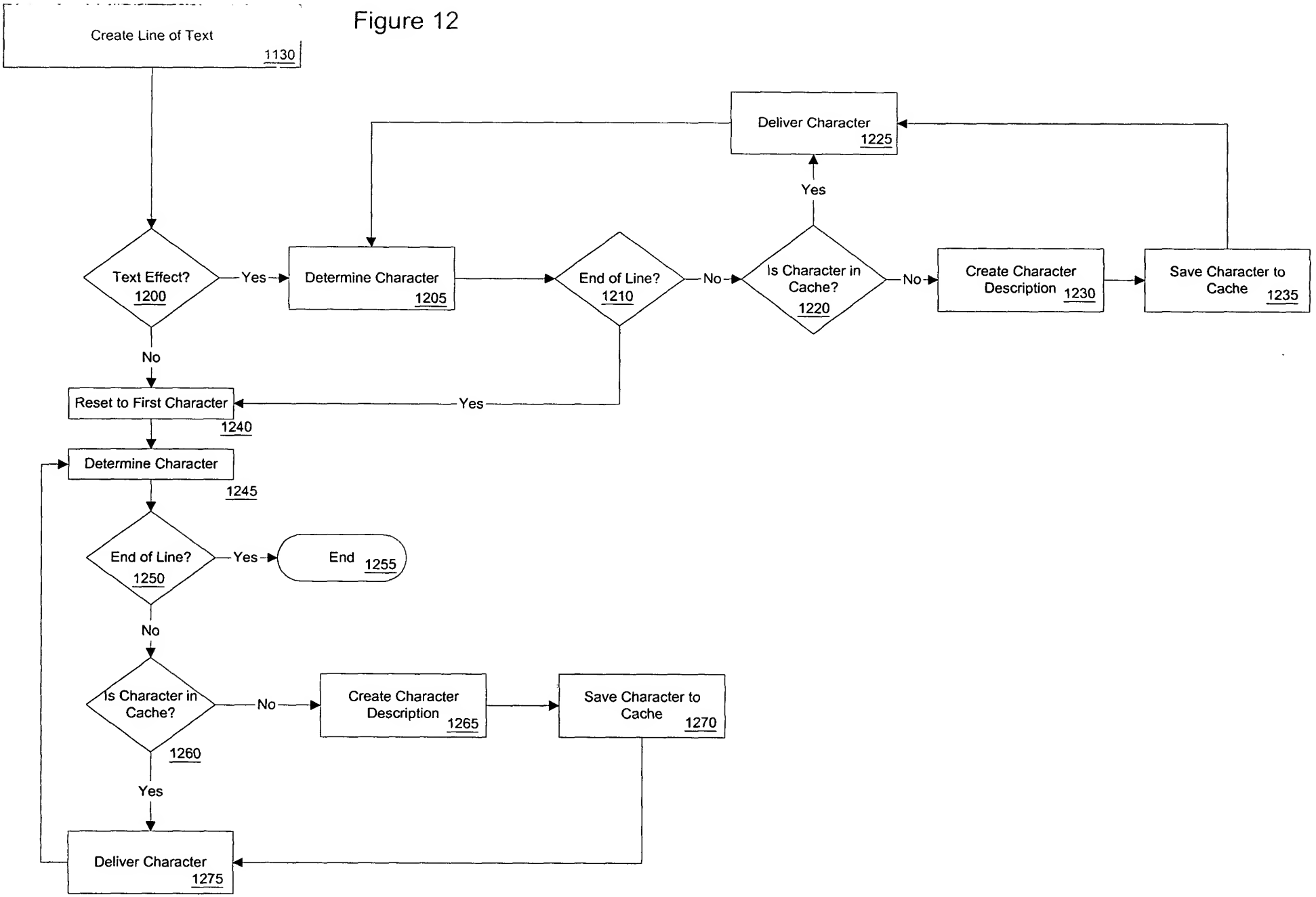

Create Line of Text
1130
Deliver Character
1225
Yes
Text Effect?
1200
Yes
Determine Character
1205
End of Line?
1210
No
Is Character in Cache?
1220
No
Create Character Description
1230
Save Character to Cache
1235
No
Reset to First Character
1240
Yes
Determine Character
1245
End of Line?
1250
Yes
End
1255
No
Is Character in Cache?
1260
No
Create Character Description
1265
Save Character to Cache
1270
Yes
Deliver Character
1275

Figure 13

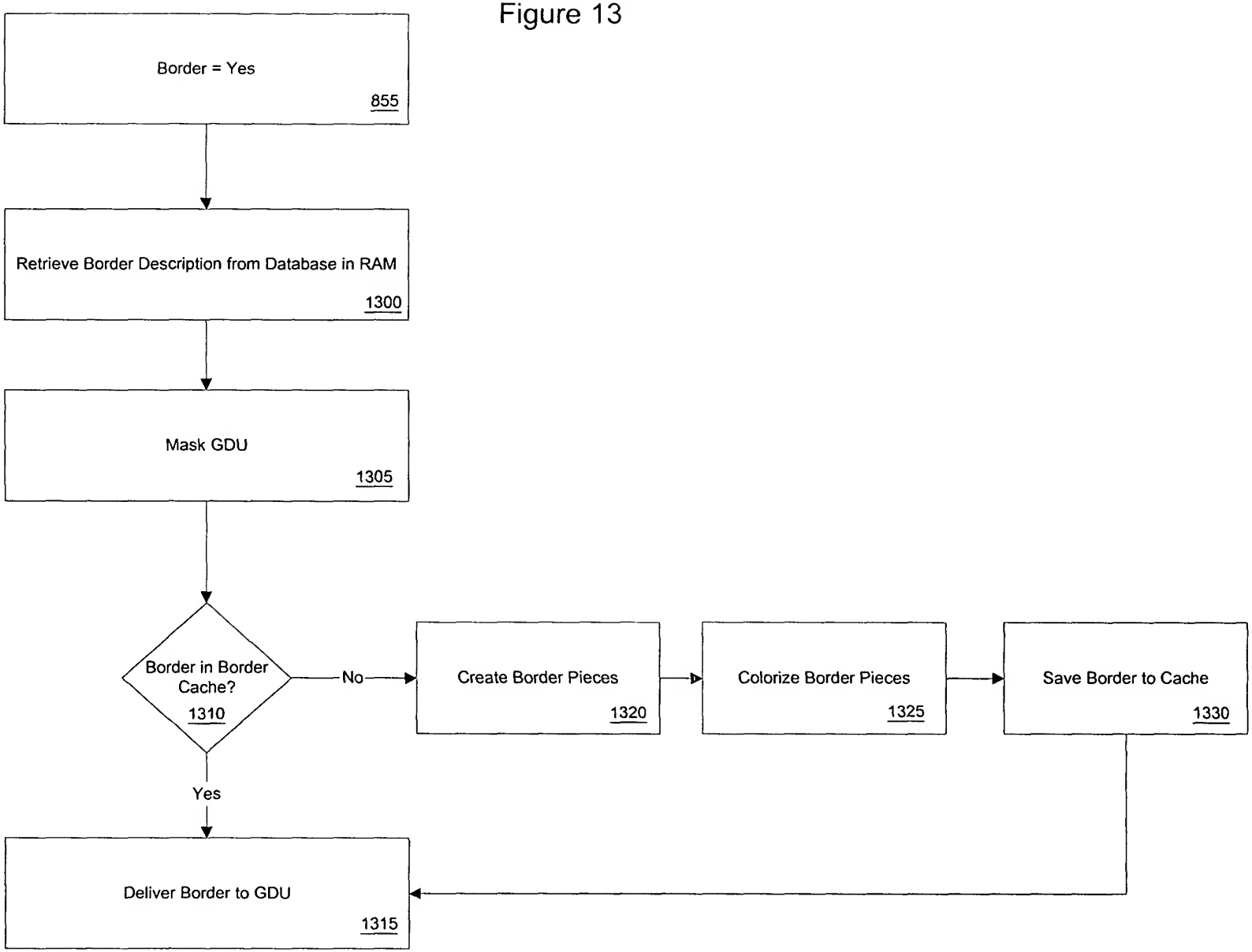

Border = Yes
855
Retrieve Border Description from Database in RAM
1300
Mask GDU
1305
Border in Border Cache?
1310
No
Create Border Pieces
1320
Colorize Border Pieces
1325
Save Border to Cache
1330
Yes
Deliver Border to GDU
1315

FIGURE 14

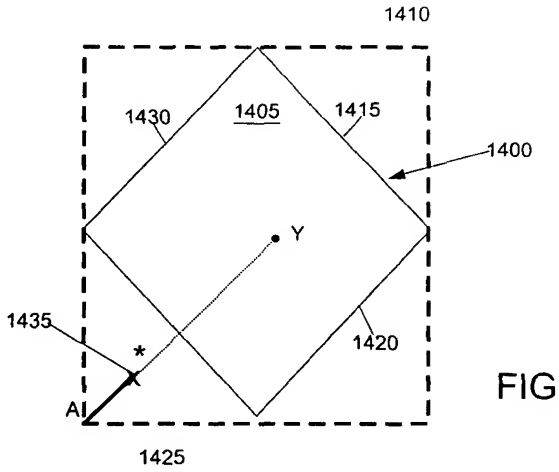


FIGURE 14A

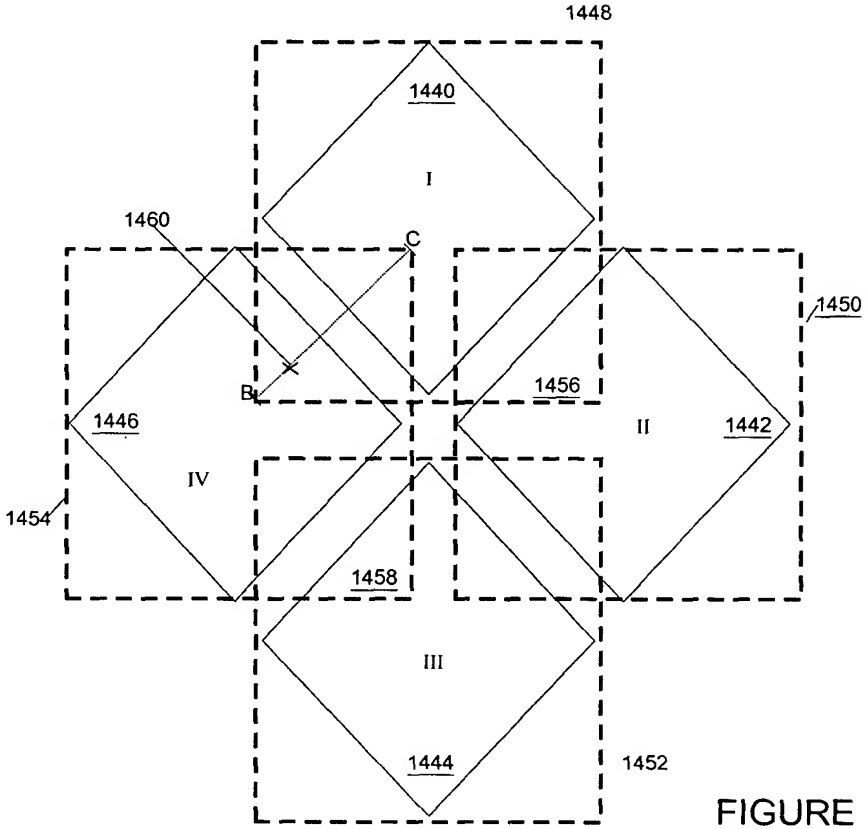


FIGURE 14B

Figure 15

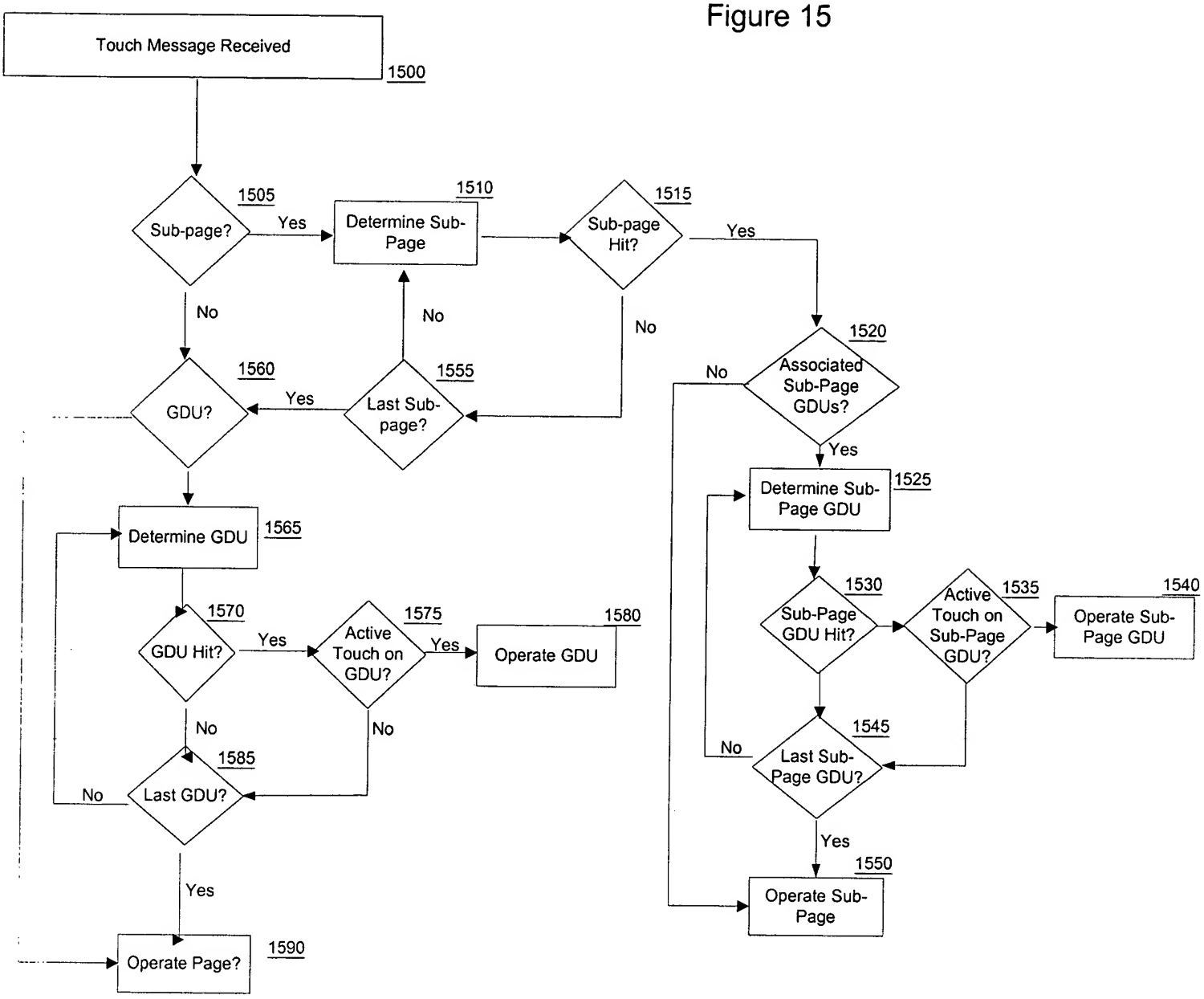
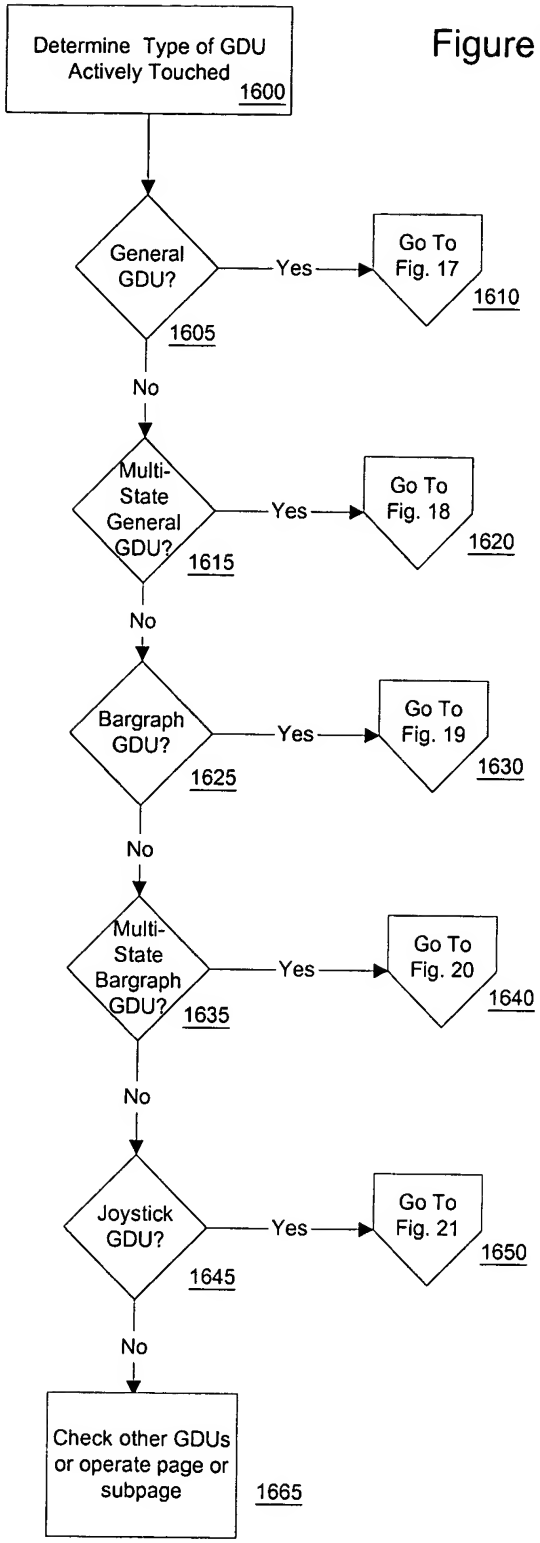

Touch Message Received
1500
Sub-page?
1505
Yes
No
Determine Sub-Page
1510
Sub-page Hit?
1515
Yes
No
No
Last Sub-page?
1555
GDU?
1560
Yes
Associated Sub-Page GDUs?
1520
No
Yes
Determine Sub-Page GDU
1525
Sub-Page GDU Hit?
1530
Active Touch on Sub-Page GDU?
1535
Operate Sub-Page GDU
1540
No
Last Sub-Page GDU?
1545
Yes
Operate Sub-Page
1550
Determine GDU
1565
GDU Hit?
1570
Yes
Active Touch on GDU?
1575
Yes
Operate GDU
1580
No
No
Last GDU?
1585
No
Yes
Operate Page?
1590

Figure 16


Determine Type of GDU Actively Touched
1600
General GDU?
1605
Yes
Go To Fig. 17
1610
No
Multi-State General GDU?
1615
Yes
Go To Fig. 18
1620
No
Bargraph GDU?
1625
Yes
Go To Fig. 19
1630
No
Multi-State Bargraph GDU?
1635
Yes
Go To Fig. 20
1640
No
Joystick GDU?
1645
Yes
Go To Fig. 21
1650
No
Check other GDUs or operate page or subpage
1665

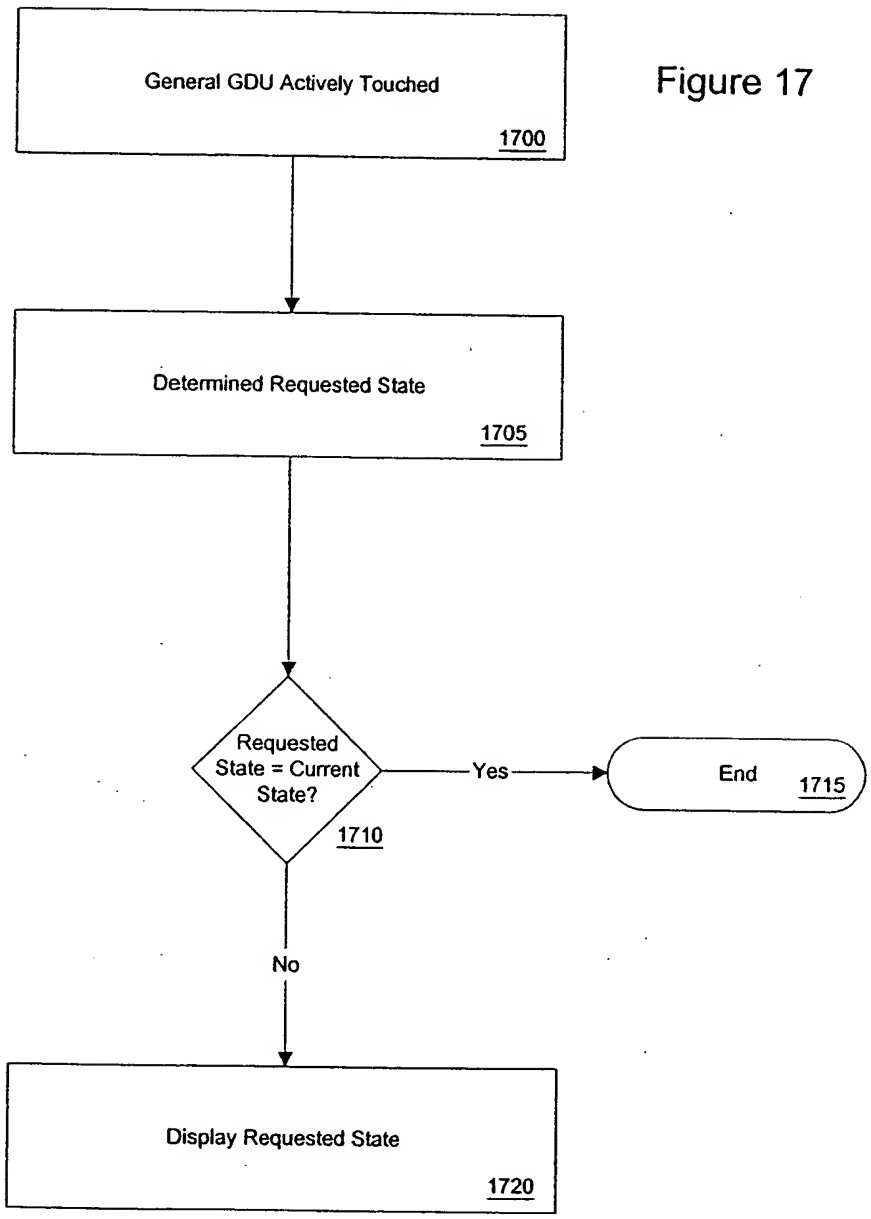
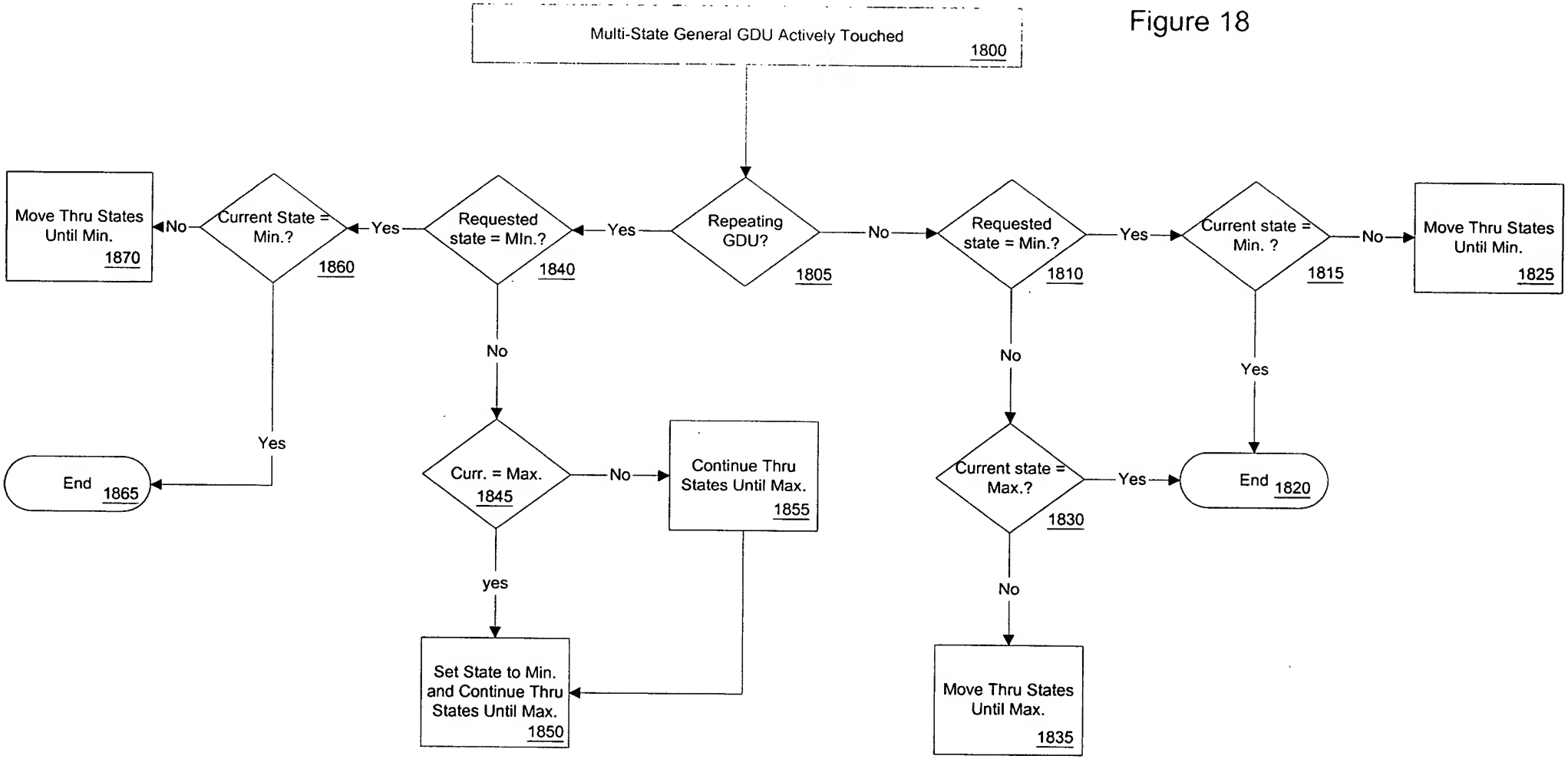

General GDU Actively Touched
1700
Determined Requested State
1705
Requested State = Current State?
1710
Yes
End
1715
No
Display Requested State
1720

Figure 17

Figure 18


Multi-State General GDU Actively Touched
1800
Repeating GDU?
1805
Requested state = Min.?
1810
Current state = Min. ?
1815
Move Thru States Until Min.
1825
Requested state = MIn.?
1840
Current State = Min.?
1860
Move Thru States Until Min.
1870
Curr. = Max.
1845
Continue Thru States Until Max.
1855
Current state = Max.?
1830
End
1820
End
1865
Set State to Min. and Continue Thru States Until Max.
1850
Move Thru States Until Max.
1835
Yes
No

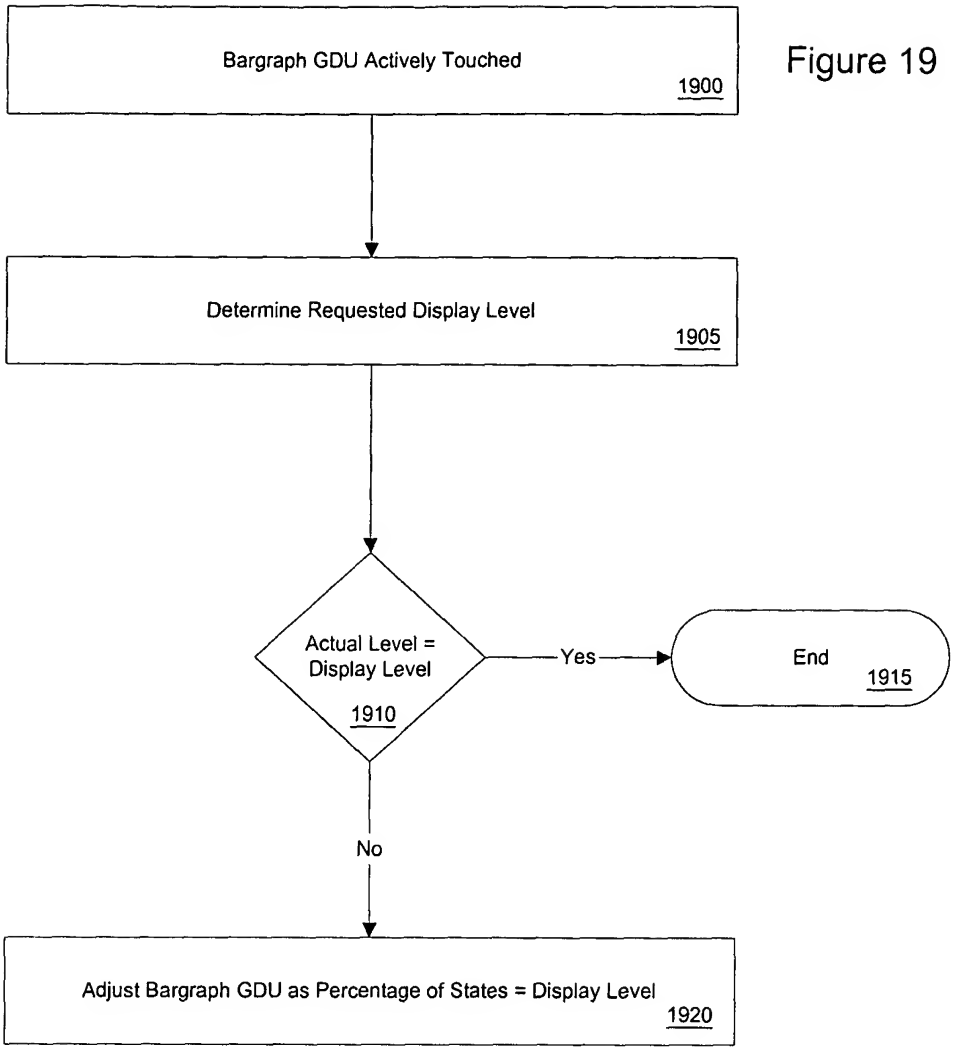
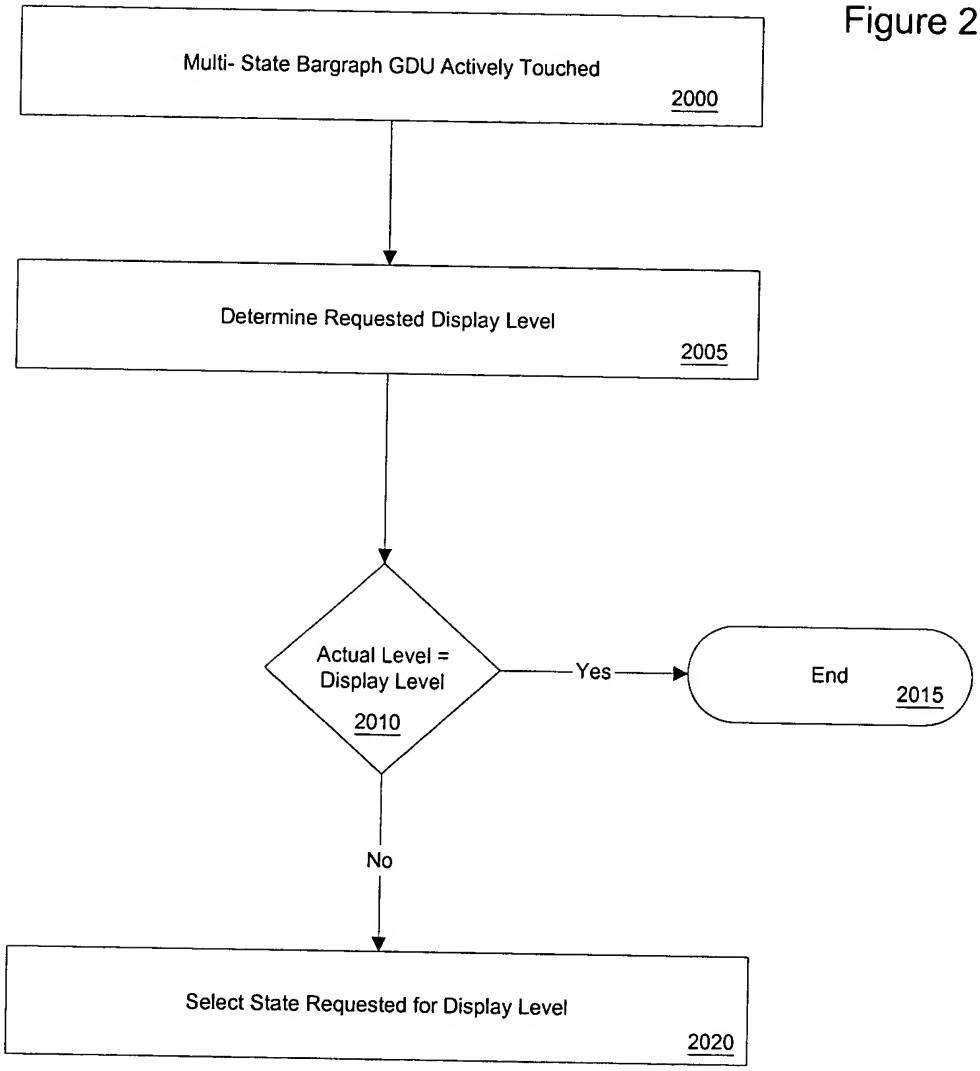

Bargraph GDU Actively Touched
1900
Determine Requested Display Level
1905
Actual Level = Display Level
1910
Yes
End
1915
No
Adjust Bargraph GDU as Percentage of States = Display Level
1920

Figure 19

Figure 20


Multi- State Bargraph GDU Actively Touched
2000
Determine Requested Display Level
2005
Actual Level = Display Level
2010
Yes
End
2015
No
Select State Requested for Display Level
2020

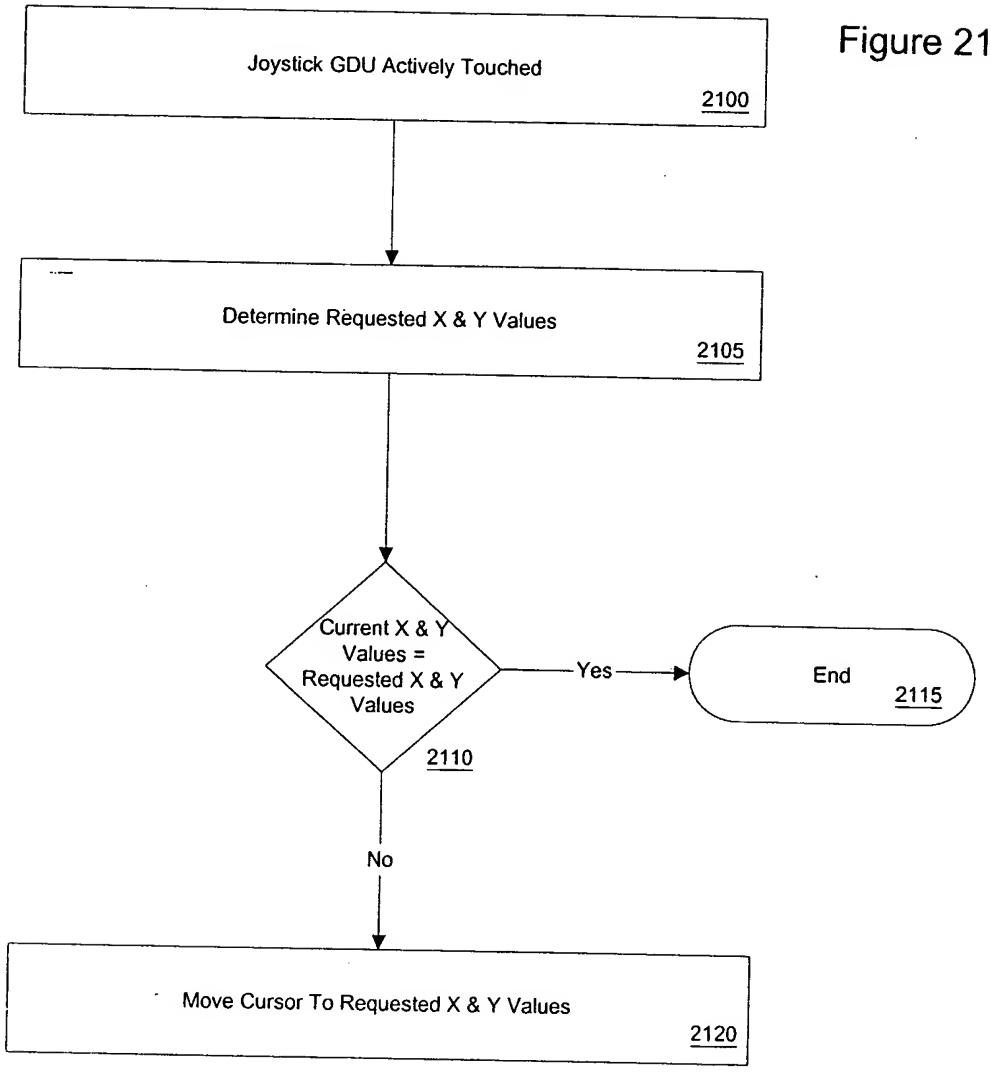

Joystick GDU Actively Touched
2100
Determine Requested X & Y Values
2105
Current X & Y Values = Requested X & Y Values
2110
Yes
End
2115
No
Move Cursor To Requested X & Y Values
2120

Figure 21